

1. Title of the Invention

Method of Manufacturing Liquid Crystal Display Device

2. Claim

A method of manufacturing a liquid crystal display device using opposed substrates, each having a transparent electrode, an insulating film formed on the electrode, and a perpendicular alignment layer of a perpendicular alignment agent such as octadecyl triethoxy silane (ODSE) formed thereon, the method comprising the step of:

bonding said opposed substrates at peripheral portions thereof through a seal material containing a silane coupling agent having a chemical structure such that an epoxy group

of $\begin{array}{c} \text{CH}_2 - \text{CH} - \text{CH}_2 - \\ \quad \quad \quad \diagup \quad \diagdown \\ \quad \quad \quad \text{O} \end{array}$ is located at one end thereof, and an alkoxy silane group of $\text{Si}(\text{OC}_m\text{H}_{m+1})_3$ ($m = 1-2$) is located at the other end to define a cell.

[Advantage of the Invention]

As described above, according to the invention, substrates each having a perpendicular alignment layer of ODSE, etc. formed on the surface thereof are bonded together through a seal material of an epoxy synthetic resin adhesive enriched with a silane coupling agent such as EESM, to define a cell. As a result, a linear hydrocarbon group with a larger

number of carbons in a perpendicular alignment layer exhibits hydrophobicity. The linear hydrocarbon group has an affinity for the epoxy group of the silane coupling agent and therefore the perpendicular alignment layer and the seal material attract each other to produce a sealing effect with an excellent adhesion. For this reason, the seal material may not be broken in printing the seal material, and it can keep a strong adhesion even after the curing of the seal material. In addition, the seal material is much effective in durability at high temperatures and humidities. Furthermore, a silane coupling agent to be added to the seal material is less expensive and therefore the invention is cost-effective.

4. Brief Description of the Drawing

Fig. 1 is a schematic sectional view of a main part of a liquid crystal display device formed according to the invention.

1, 2	SUBSTRATE
1a, 2a	TRANSPARENT ELECTRODE
3, 4	INSULATING FILM
5, 6	ALIGNMENT LAYER
7	SEAL MATERIAL
8	LIQUID CRYSTAL

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